

The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited

Telephone: CENTRAL 3212 (10 lines)

Annual Subscription, 21s.
Overseas, 26s.

VOL. XLII. No. 1092

June 1, 1940

More Man-Power Problems

WITH the increasing withdrawal of men from industry and the increasing pressure of industrial war-work, problems of labour and staff inevitably come to the fore. Certain aspects of this subject were dealt with in recent issues of THE CHEMICAL AGE, these being principally problems that arise as between employees and the Services. The practice of firms in relation to reserved occupations appears to vary considerably, and depends to some extent upon the policy of the Board and to a greater extent upon the nature of the work upon which the firm is engaged. Firms that are engaged upon urgent work of national importance, and it is difficult to discover firms in the chemical or chemical plant industries that are not, are justified in endeavouring to retain every man for whom a case can be made out. The importance of industry in this war is greater than in any previous war. We are indeed fortunate that we had the experience of the muddle caused by indiscriminate enlistment in 1914 to guide us to-day, for if we had permitted equally indiscriminate withdrawal of men from industry now as we did then, our plight would be parlous indeed, and the scandal of the shell and munition shortage of 1915 would be repeated in a far more acute form. Other firms engaged in less essential work are not taking steps to retain any men whom the authorities desire to take if they are below a certain age, usually 30 years. Even in the same industry, however, there is no common policy.

As industry becomes shorter of man-power—and who can doubt that if this war lasts for long man-power will become a very important problem indeed?—substitutes must be found. To-day we have in increasing availability a substitute that was not much in evidence 25 years ago. This new servant is Automatic Control. The development of thermoelectric or potentiometric controls has advanced apace, and to-day there are few, if any, continuous processes that cannot be automatically controlled if the necessary apparatus is designed for the purpose. The automatic recording of temperatures, pressures, and in certain instances of analyses, has long been recognised in industrial practice. The automatic control of processes by regulation of the flow of heat, of steam, of reacting products, and so forth is newer, but is of inestimable value. It has proved its worth in permitting the installation of plant under circumstances in which the particular process would not otherwise have been economic. Two examples may be given, both, as it happens, from the carbonising industries. The last war saw ammonia disappear from the credit side of the balance sheet

of these works, to reappear on the debit side. The smaller works were at once faced with the grave problem of whether to recover ammonia at a loss, or to find some means of disposing of the ammonia without recovery, this last being a very intractable problem. Within the last few years automatic plant has been designed for the production of ammonia liquor of high strength which, by removing the necessity for a man's constant attention, has permitted the recovery of ammonia even on small works once more to show a small credit balance. Works managers would be well advised to develop automatic control while there is time.

Concurrently with automatic control, there is the use of unskilled labour, particularly women. It is unnecessary to go into this subject in detail here, beyond pointing out that it is amazing to what extent women can be trained in a short time to take charge, under supervision, of industrial, and even of chemical, processes. We had personal experience of this in the last war, and with the added advantage of automatic control, even more can be done now if employers will take the trouble to prepare in advance.

A more sinister side of the labour problem was discussed in Parliament recently. There is now an acute shortage of skilled men, particularly in the engineering trades, and many firms, amongst whom are some not unknown in the chemical industry, are finding that workmen are being attracted, as a deliberate policy on the part of unscrupulous employers from other firms, by the offer of exceptionally high wages or other inducements. A bonus is even paid to men who can bring in their friends, though this is, of course, very difficult to prove in specific instances in which it is alleged to have occurred. The difficulty arises in the ship-repairing industry, and apparently also by reason of some firms obtaining armament contracts without having the necessary skilled labour, which they then proceed to recruit from the ranks of other firms who are already perhaps hard pressed to keep their promises of delivery for important Government orders. Employees thus transplanted take some time to settle down to their new work and thus production is lost at both ends. The Ministry of Labour is prepared to issue orders regulating the transfer of men in skilled occupations. Many employers would like to see a revival of the Munitions Act, passed in the last war, which made it illegal for an employer to engage a workman who had been employed elsewhere on munitions work.

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N O T E S A N D C O M M E N T S

The Supreme Effort

FOR a fortnight after the German invasion of Holland and Belgium we held our breath. With the capitulation of King Leopold, we began to set our teeth. British nerves are not easily frayed and, the more the nation is called upon to defend itself with its own resources, the better showing it will make on the pages of history. In the lifetime of the oldest among us there has been no month so starkly black as May, 1940. Far, however, from damping the national effort, it has actually stimulated it to an unexampled degree. It brought into being overnight an immense new army of Local Defence Volunteers. It led to an unprecedented speed-up in aircraft factories and munition works, with the machinery going twenty-four hours a day and seven days a week and Sunday labour cheerfully undertaken on a day set aside by the King for national prayer. Instead of there being a fearful sapping of morale, the percentage of conscientious objectors in the class which registered last Saturday was far lower than it had ever been before. The outlook remains grim in the extreme, but in the long run it is a bleaker one for our enemies than for ourselves and our gallant French allies. British industry places itself unreservedly at the disposal of the nation for the duration of the war. There is no sacrifice that manufacturers and workpeople, wholesalers and retailers will not undergo to ensure the final triumph. Although technically under a form of war-time conscription, their offering of all they have and are is freely made and can have no other reward but the restoration of freedom to a devastated world.

National Savings Week

THE National Savings Committee is organising a National Savings Week from June 9 to June 15. The object is not so much to raise a large sum of new money during the week, but to increase the number of Savings Groups. Of these there are already over 80,000. By

June 15 it is hoped to achieve at least 100,000. Closely allied to this main object is the desire to increase the membership of existing groups and to increase the amounts of the weekly subscriptions to them paid by members. Of the Savings Groups formed since last November, 75 per cent. are in places of employment. The action of the Government in exempting from various means tests £375 worth of new savings has drawn from the Trade Union Congress a declaration and a broadcast urging all Trade Unionists to support the voluntary savings movement. Organised employers have given assurances that proof of the workers' capacity to save shall not prejudice future wage negotiations. It is hoped that these assurances will result in a strong stimulation of savings groups in all industries and trades. Employers who have not yet formed groups or given facilities for their formation should place themselves in touch with the National Savings Committee, Sanctuary Buildings, 20 Great Smith Street, London, S.W.1.

Lord McGowan on Safety First

ORD McGOWAN, K.B.E., addressing the first annual meeting of the National Safety First Association, of which he is president, emphasised that safety first was, paradoxical as it might seem, entirely appropriate to war conditions. "One of the main characteristics of modern warfare," he said, "is to reduce to a minimum the vulnerability of our people whether on the fighting or the home front." A lost-time accident in a factory should be reckoned as much a gain to the enemy as a casualty to the armed forces. An energetic Safety Department in each factory could make a substantial contribution towards improving the general spirit of the workers. Many factors avoided in peace time would now operate severely in the direction of increasing accidents. Thousands of new and inexperienced workers are being engaged and huge construction programmes are being urged forward at a high speed involving long hours, night work and the inevitable strain of factory A.R.P. measures. Lord McGowan said that the works managements of his own company, Imperial Chemical Industries, Ltd., were being encouraged to deal with the problem by: (1) the intensification of pre-war safety work with very special attention to committee work and education and propaganda; (2) making more use of experienced employees and foremen to keep a friendly eye on new workers; (3) extra attention to the all-important safety factor, works tidiness, with particular regard to the placing of vehicles and the dangers of black-out; and (4) examination of the needs of individual workers in relation to the new lighting restrictions. The final responsibility rested with industrial managements and no permanent progress could be made unless the works director, works manager, engineer and foreman each accepted his full share of work and responsibility.

From a Swedish Correspondent

"IN the rebuilding of Europe which must take place when this period of war is finished, the fertiliser industry will probably be of greater importance than ever, and an increase in the efficiency of the phosphoric acid fertilisers will result in increased harvests and cheaper production of foodstuffs. In a country as small as Sweden the increase of harvests due to artificial fertilisers is calculated to be worth about ten million pounds a year. On 85 per cent. of the soils phosphoric acid is lacking. Even a small increase in the effect of the phosphatic fertilisers used will mean considerable sums."

THE POTATO PRODUCTS INDUSTRY—IV.

Potato Alcohol Production FROM A SPECIAL CORRESPONDENT

(Continued from page 292, "The Chemical Age," May 25)

IN recent years 150,000 tons of alcohol have been produced annually by the Germans from their potato crop, a considerable increase on the earlier output. Formerly, a large proportion of this alcohol was used alone as power spirit in driving various farming implements and farm-lighting equipment. But in the past few years the Reich has requisitioned practically the whole of the alcohol output for admixture with petrol to be used chiefly in the various war machines. Over the same period in Great Britain figures issued by the Excise authorities also show a remarkable increase in the production of alcohol for power and solvent purposes. Unfortunately for us, however, the bulk of industrial alcohol produced here comes from molasses, not potatoes; so that at a time when alcohol is most needed to supplement petrol supplies we must limit our alcohol raw material owing to the necessity for economy in shipping space.

There is nothing in the nature of things to prevent alcohol being produced from potato glucose syrup, or the manufactured dextrine or starch; but as these products have only been created by relatively costly processes it is cheaper to manufacture alcohol from potatoes direct; although, just as off-grades of starch or dextrine can be used for glucose manufacture, so discoloured glucose or syrup showing signs of mildew, etc., may be utilised for alcohol production. It will be seen, therefore, that the various potato products are most economically produced when an unlimited interchange of products between the factories concerned is possible; because in this way wastage of materials not up to standard is avoided.

In manufacturing alcohol from potatoes direct the washed tubers are introduced through a manhole in the top of a pressure vessel, a normal charge for the vessel being 5 to 6 tons of potatoes. The autoclave, generally built up of welded or riveted steel plates, has a perforated steam coil in the base and a similar coil underneath the dome. When the batch of tubers is all in the vessel steam is first blown upwards from the bottom coil and through to atmosphere to expel air. Then the manhole is clamped firmly down and the potatoes steamed under pressure of about two atmospheres, for thirty minutes; thus the temperature is high enough to destroy any harmful bacteria which might "poison" the subsequent fermentation process; while at the same time the tubers are converted to a suitable pulp and the starch is gelatinised. The steam to the bottom coil is next shut off, the discharge valve in the base opened, when the internal pressure forces the pulp through a perforated disc in the conical bottom of the vessel. Cleaning and emptying of the vessel is facilitated by blowing steam from the upper coil under the dome downwards.

Conversion of Dextrin to Maltose

Underneath each autoclave is a jacketed mashing vessel, provided with stirring gear, which is set in motion as the hot pulp falls in, cold water to about half the volume of the pulp being added. Cooling of the pulp is also assisted by circulating cold water through the jacket. When the temperature of the pulp has fallen to 40° C. about 8 per cent. of barley malt is added, the mash becoming thinner after a short period owing to the amylase constituent of the malt converting the starch to water-soluble dextrin. Samples of the mash are taken as stirring continues and tested with a drop of iodine solution; if the blue coloration persists after prolonged stirring it is necessary to add a little more malt to break down the remainder of the starch to dextrin. When this stage is reached the mash is warmed to between 52° and 55° C. by circulating steam through the jacket, which materially assists

the dextrinase of the malt to convert the dextrin to maltose. Actually both maltose and glucose are present in the latter stages of the mashing process, the latter sugar resulting from the action of the glucose in the malt. This weak sugar liquor now corresponds to the "wort" of molasses distilleries, and its fermentation by yeast follows on identical lines, a process well known in this country and needing no explanation here. It may be pointed out, however, that the distiller's wort differs from the brewer's wort, in that diastatic activity in the wort is not destroyed by boiling as in brewing beer, but is carefully preserved by maintaining a low temperature so that it may continue to convert dextrin to sugar and thus obtain the maximum material available for fermentation. Because of this necessity for maintaining a low temperature the distiller is at a disadvantage as compared with the brewer, for the latter can destroy any harmful bacteria—generally from the malt—in his boiling process; but the distiller has to rely on chemical agents to keep down the growth of such bacteria, or otherwise be satisfied with a smaller fermentation yield, for he cannot sterilise his malt by heating except at the expense of its essential diastase.

The Amylo Process

The difficulty of obtaining a malt for distillery use free from undesirable bacteria has led to the intensive development of the so-called "amylo process" in Germany; although this had already been successfully applied in other countries to cereal mashes. In this process malt is dispensed with. Instead, certain moulds, such as *Rhizopus Delemar*, chiefly from China and Japan, and cultivable at controlled temperatures on moistened rice, are used. These moulds have several advantages over malt: they are capable of converting starch to sugar and the sugar to alcohol, but as the latter operation is a slow procedure compared with the action of yeast, the moulds are used mainly to replace malt, and yeast is used to ferment the sugar to alcohol in the ordinary way. A much lower proportion of these moulds is used than is the case with malt, and they yield a higher sugar content in the wort, and therefore more alcohol. Owing to the very small proportion of the mould used for mashing it is possible to cultivate all the mould required by a large distillery under the aseptic conditions of a laboratory; thus the risk of contamination—unavoidable in the large-scale production of malt—is obviated. About 2 lb. only of the mould culture on rice is added to every ton of pulp, this being previously rendered slightly acid with HCl, and the temperature maintained at about 40° C. for 36 hours, during which a current of air is blown into the mash to provide agitation and to expel any CO₂ resulting from the alcohol-producing properties of the mould. In this period the mash is converted to wort, differing only from ordinary malt wort in that it contains some alcohol even before it has come into contact with yeast. This wort is next subjected to fermentation by yeast in the usual way.

The theoretical yield of alcohol from the fermentation of the wort is 56.8 per cent. of the original starch in the potatoes, but in practice only about 52 per cent. is obtained. This difference is attributable to unconverted dextrin; to dextrose being taken up by the yeast cells; and to decomposition of the alcohol. The liquor resulting from the fermentation of the wort is known as "wash," and it may contain anything between 5 and 10 per cent. of alcohol, according to the strength of the original wort. It is necessary to filter the wash before distilling it, to separate fibre, residual yeast and other solids. Owing to the colloidal nature of the yeast, etc., it is usual

to filter the wash through a pulp press, because press cloths quickly clog up and become useless. Modern stills produce an alcohol up to 97 per cent. strength in one operation, even when working with a wash as low as 5 per cent. alcohol; and

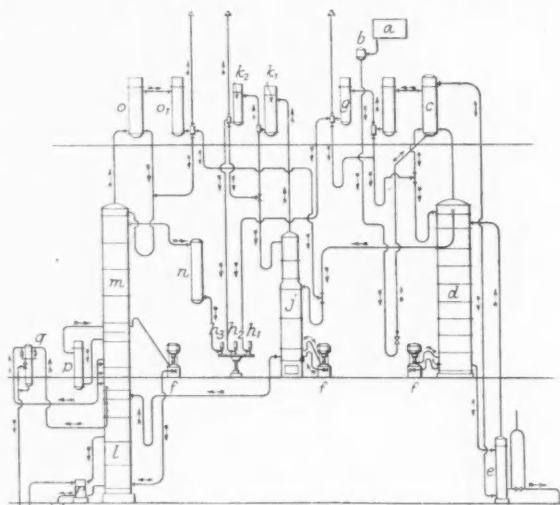


Fig. 13. Flow-sheet of a three-column potato-alcohol still.

it is interesting to note that many of the newer stills in German distilleries are British made. A typical British company exporting stills of this type is Messrs. Blairs, Ltd., Govan, Glasgow; one of their alcohol stills being seen in Fig. 12, in course of erection for testing before being sent abroad (illustration on p. 292 in THE CHEMICAL AGE, May 25, 1940).

The working of this plant, a standard type three-column still, may be seen from the diagram Fig. 13. The weak alcoholic wash is pumped to the supply tank A, from which it flows by gravity to the wash regulator B, which automatically maintains a constant pressure of liquid on the feed, irrespective of the amount in the supply tank. From B the wash flows to a heat-exchanger C, where it is heated by the vapour from the boiling column D. It then passes to a second heater E, where its temperature is still further raised by the hot spent wash from D. From E the liquor flows to the boiling column D, in which the alcohol is extracted, the spent wash discharging at the bottom through the heater E, and thence to the drain. The steam passing into the bottom of D is regulated automatically by the steam regulator F, and is the exact amount necessary to exhaust the wash completely of its alcohol. This regulation is governed automatically by the rectifying columns themselves, so that human error is eliminated. The vapour from column D passes out at the top of the first heater C, in which part of the higher boiling products are condensed and returned to D, whilst the purer vapours pass on to the column alongside, where more of the higher boiling constituents are extracted and returned to D. At the same time the vapour containing the "head" products is passed to the condenser G, where the final condensation takes place, a portion being returned to D, and the remainder, which constitutes the aldehydes, being collected at the observation glass H₁. From near the top of D the spirit flows into the purifying column J, in which the head products are driven off, a portion being condensed to the rectifier K₁ and returned to the top of J. The remainder then passes to the condenser K₂, a portion of the condensate being returned likewise to the top of J, and the residue, that is the head products, collected at observation glass H₂. All vapours from the top of column M are partly condensed in the rectifier O, the reflux being returned to the top of the column M, while the remainder of the vapour passes to the condenser O₁. The fusel oil passes to the cooler P, being then washed in the decanting apparatus Q; this "oil" is later purified and its various constituents separated.

A new outlet for the by-product aldehydes—which are oxidation products of the alcohol, amounting up to 2 per cent. of the latter—is found in the synthetic resin industry. For this purpose they are polymerised and used in admixture with phenol in the synthetic resin trades. Fusel oil is, however, the most important by-product recovered from the still, and it forms about 2 per cent. of the original starch in the tubers. It is made up of about 65 per cent. amyl-, 20 per cent. isobutyl-, and 5 per cent. propyl-alcohol; the balance being water and more complex bodies. Fusel oil is now used commercially for making amyl stearate, amyl lactate, diethyl phthalate, etc. The price of these materials is well over £100 per ton, so that the fusel oil is now regarded as a very profitable by-product of the distillery, so much so that the wily German distiller contrives to increase his output of fusel oil, the disposal of which he controls, at the expense of the alcohol, the control of which immediately passes to the Reich.

In concluding this short series on potato products it is interesting to note that during the last two years the potato plant has been made to produce, in Germany, still another article of commerce, paper, to replace wood-pulp, which in turn replaces metal for many purposes. About a month before the present war started the first German newspaper printed on paper produced from the leaves and stems of the potato plant was published. It was originally planned that, by the end of this year 1940, 35 per cent. of the total paper used in Germany should be potato paper.

SUGAR-FREE AMYLODEXTRIN

A method for the production of a sugar-free amyloextrin is proposed by the I.G. Farbenindustrie in Fr. Pat. 852,933. It suggests that the dextrin can be produced by hydrogenation of starch in the presence of a catalyst. As for ordinary dextrine production methods, the most suitable starch to use as raw material is potato starch, though any other type can be used. With 100 parts of starch mix 200 parts of water, and subject it to treatment of a hydrogen atmosphere at 30 atm. and 170° C. for 20 hours. The water can then be evaporated out and the dextrin left as a dry residue. This dextrin, it is claimed, will not react with Fehling's solution, but does give a blue coloration with iodine. Unlike starch, it will not swell. Ordinary commercial dextrine, which frequently reacts to Fehling's solution, can be produced in four hours at 120° C. and 30 atm. hydrogen pressure, or at 150° C. in about one hour.

MAGNESIUM PHENYLATE PRODUCTION

Bakelite G.m.b.H. has devised a method for the production of magnesium phenylates which, by ordinary methods, are both slow and difficult to produce. They have found (Fr. Pat. 852,593) that if the reaction takes place between measured quantities of magnesium oxide or hydroxide and phenol, in the presence of water—but not necessarily in solution—in a crusher, the operation can be carried out quite easily. Eighty parts by weight of magnesium oxide, 413 parts of liquid phenol and 38 parts of water are made up into a thick creamy mass and put into a crusher in which it is mixed for 16 hours. The mass will solidify after two or three days' setting. Another possibility suggested is 160 parts of magnesium oxide and 864 parts of cresol with 150 parts of water. The time of mixing required is also about 16 hours at room temperature.

AT A MEETING of the Parliamentary and Scientific Committee at the House of Commons last week it was decided in view of the grave situation which had revealed itself to hold regular weekly meetings in future to examine all ways by which a greater application of scientific knowledge could be applied to the conduct of the war in its various aspects and to bring these matters to the immediate notice of the appropriate Ministers. The first of these meetings was held at the House of Commons last Wednesday afternoon.

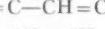
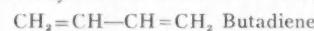
A Note on Synthetic Rubbers

Buna Development in the U.S.A.

THE agreement made by the Standard Oil Development Co. with the Standard Oil Co., of Louisiana, to erect a Buna synthetic rubber plant at Baton Rouge in that State (to begin operations at the end of this year) has awakened much interest in the United States and elsewhere. It will be remembered that the Standard Oil Co. acquired the rights for the production of synthetic rubbers from the I. G. Farbenindustrie earlier this year, as reported in THE CHEMICAL AGE (42, 1077, p. 104). Detailed accounts of the nature and properties of the Buna and other synthetic rubbers have appeared in the specialist Press of the rubber industry, but it will not be out of place to publish here some notes on the chemical characteristics of the synthetic polymers involved, extracted from a paper presented by Mr. P. K. Frolich, of the Standard Oil Development Co., New Jersey, to the New York Rubber Group of the American Chemical Society.

Like most naturally occurring products, rubber has certain shortcomings that limit its applications. Its strong point is its peculiar molecular structure which accounts for its elastic properties and mechanical strength. Its weak point is its pronounced chemical reactivity, which is responsible for low resistance to oxidation, lack of heat stability, and susceptibility to acids. While the first work on synthetic rubber tried to duplicate Nature's product, the present effort is to reproduce—or even to improve upon—structural characteristics of the rubber molecule. Extensive researches initiated by the I. G. Farbenindustrie in 1927 with such a goal in mind led to development of the products known as Buna rubbers. Working along entirely different lines, but following the same principle, the du Pont interests developed Neoprene.

The structures of the monomers, the starting units for the synthetic rubbers discussed here, are as follows:



The chief synthetic rubber products to-day are:

Buna (generally accompanied by a number referring to specific physical properties). A straight butadiene polymer. In this class also falls the product manufactured in Russia.

Buna S. A copolymer of butadiene and styrene.

Perbunan (also referred to in earlier publications as Buna N). A copolymer of butadiene and acrylonitrile.

Perbunan Extra. Same type as perbunan but with a higher content of acrylonitrile.

Neoprene. A polymer of chloroprene.

There is also a class of intermediate products which, although they possess definite elastic properties, do not lend themselves to the characteristic type of vulcanisation because of their chemical saturation. These are Koroseal, a polymer of vinyl chloride; Thiokol, a condensation product of aliphatic chlorine-containing compounds and sodium polysulphide; and Vistanex Polybutene, a linear polymer of isobutylene.

Although Nature's rubber production probably is the out-

come of a series of condensation reactions involving oxygenated intermediates, from a structural standpoint the rubber molecule can be considered a polymer of isoprene, or 2-methyl butadiene. The original methyl rubber manufactured in Germany in 1914-18 was made from 2,3-dimethyl butadiene simply because this diolefine could be made available more readily than isoprene. The present choice of butadiene and chloroprene (*i.e.*, 2-chlorobutadiene) as raw materials for synthetic rubber production is probably also largely a matter of availability and cost. No published information leads to the conclusion that isoprene would be less suitable for the manufacture of a satisfactory product by present polymerisation methods.

Emulsion Polymerisation

Diene polymerisation may be carried out either in bulk or emulsion form. Earlier work was based on bulk polymerisation by the aid of slightly elevated temperature only, a slow process and one not easily controlled. Methyl rubber was made in this manner. The first Buna rubber was produced by bulk polymerisation of butadiene with metallic sodium as the promoter, the name having been derived from this combination (Bu + Na). This also was a slow process and, as it did not lend itself to the production of copolymers containing polar compounds, was abandoned in Germany for the emulsion method. Judging by the limited published accounts, however, the older method is still in use in Russia.

In the emulsion technique, the ingredients are emulsified with water and subjected to conditions of temperature and pressure suitable for converting them into a suspension of synthetic rubber which resembles the latex obtained from a rubber tree. Compared with older methods, the polymerisation proceeds quite rapidly. Although the process requires close control, it does not present any problems that differ greatly from those ordinarily met with in modern chemical manufacturing operations. Recovery of the synthetic rubber from the emulsion is similar to the recovery of the natural rubber from latex.

It is reasonably certain that the natural rubber molecule is a head-to-tail polymer of the isoprene unit. This means that one double bond is consumed in making up the chain structure so that only one double bond remains per C_5 -unit. Analysis shows the actual unsaturation to be very close to 100 per cent. of the theoretical calculated on this basis. The molecular weight of the rubber molecule is not so well known but may be considered as being about 150,000.

The synthetic polymers closely approach this general molecular build-up as far as chainlike structure and molecular weight are concerned. However, the fact that the unsaturation generally is somewhat less than the theoretical indicates that some double bonds have been consumed in cross-linkages between polymer chains. This reinforcement or bracing of the molecule probably is responsible for the greater toughness of the synthetic products. To bring about the desired molecular breakdown more severe milling conditions are required, although, as the molecular weight is reduced, this distinction becomes less noticeable. Thus, a sample of Perbunan milled to give the proper plasticity for compounding was found to have a molecular weight of 35,000 to 40,000, a value comparable to that of natural rubber in the same state.

If, as is probable, the incorporation of styrene or acrylonitrile further reduces the chain unsaturation, this may account for the greater chemical inertness of the resulting polymers. Both these products are characterised by superior heat resistance, ageing qualities, and resistance to abrasion. Buna S has better electrical properties than natural rubber, and Perbunan possesses a marked resistance to swelling in petroleum hydrocarbons and many other organic solvents.

Hydrogenation of Wood

Cyclohexane Alcohols Isolated

STUDIES on hydrogenation of lignin and other plant materials at high pressures, made by H. P. Godard, Joseph L. McCarthy and Harold Hibbert (*J. Am. Chem. Soc.*, 62, 4, 988), show that maple and spruce wood meals readily undergo hydrogenation. The two latter products were first freed from resin, fats, etc., by the customary preliminary extraction treatment with alcohol benzene, alcohol, and water in the order named, then dried, suspended in anhydrous dioxane, the copper-chromium oxide catalyst added and the mixture then subjected to the action of hydrogen at about 250 to 280° at a pressure of 5000-6000 pounds per square inch (333-400 atm.) for periods of 12 to 16 hours.

The main products isolated were (a) 4-n-propylcyclohexanol-1, b. p. 92-95° (7 mm.), and (b) 4-n-propylcyclohexanediol-1,2, b. p. 107-110° (1 mm.); some higher boiling oils also were obtained. These substances undoubtedly originate from the lignin present in the wood, the combined yields of (a) and (b) in the preliminary work, when calculated on the total (*Klason*) lignin present originally, amounting to about 60-70 per cent, in the case of maple and about 35-40 per cent, in the case of the spruce meal. Similar results were obtained using wood meal previously extracted with cold 5 per cent. alkali, although in these cases the yields were somewhat lower.

Presumably other suspending media such as tetralin, decalin, cyclohexane, as well as the above solvents, can be used in place of dioxane, and these are being actively investigated.

It is of considerable interest that the accompanying carbohydrate-polysaccharide components also undergo simultaneous hydrogenation and hydrogenolysis as indicated by the large absorption of hydrogen (about 3.2 moles of hydrogen per 100 g. of wood meal). The nature of these reactions and of the resulting products is under investigation.

Some New French Patents

Chlorine-Free Caustic Soda

APATENT issued to the Etabls. Kuhlmann (Fr. Pat. 836,742) suggests a method for the production of caustic soda practically free from chlorine. This is accomplished by a slight modification of the usual process. The process suggested is as follows:—Amalgam from the usual mercury cathode sodium electrolyzers is filled into a container with distilled water. The mixture is agitated by passing air through it, the air bubbling through the water. After washing, the amalgam is sent to the usual decomposing battery where it is mixed with water as free as possible from chlorine ions. By the insertion of this washing process, Kuhlmann have been able to produce, in the first cell of the decomposing battery, a sodium hydroxide containing not over 2.5 grams of chlorine per ton of NaOH anhydride pure.

Concentrated Ammonia from Gas Mixtures

A method of obtaining concentrated ammonia gas from a gas mixture which also contains weak acids, such as carbon dioxide or hydrogen sulphide, is suggested in a patent to the I.G. Farbenindustrie (Fr. Pat. 851,942). The gas would be washed in an ordinary washing tower with a solution of a weak organic acid which is capable of forming ammonium salts unstable at a temperature below the boiling point of the acid solution. Among the acids that might be used are carboxylic acid, aminoacetic acid, iminodcarboxylic acid, etc. It is suggested that 100 cubic metres of gas containing, say, 9.3 per cent. of ammonia can be washed in 100 litres of a solution of equal parts of water and phenol. The remaining gas will contain no more than 10 mgm. of ammonia per cubic metre. The phenol solution can now be heated to drive off the ammonia, which is collected and washed in a solution of sodium hydroxide to remove any traces of phenol that might have been driven off with the ammonia.

New British Standards

Hydraulic Strength of Building Limes

ONE of the outstanding needs in the building industry has been for a standard for building limes. A standard for cement was amongst the earliest standard specifications issue, but although lime is a very much older building material it has only just been possible to issue a standard for it. The preparation of the standard was begun by the British Standards Institution some years ago, but many difficulties and problems arose which could only be solved by extensive research occupying a considerable period of time. The one that was most difficult was the devising of a suitable method for the determination of the hydraulic strength of hydrated lime.

The standard provides for quicklimes and hydrated limes under the following categories:

Quicklime for Plastering Finishing Coat, Coarse Stuff and Building Mortar : Non-hydraulic and Semi-hydraulic.

Quicklime for Coarse Stuff and Building Mortar only : Non-hydraulic and Semi-hydraulic.

Hydrated Lime for Plastering Finishing Coat Coarse Stuff and Building Mortar : Non-hydraulic and semi-hydraulic.

Hydrated Lime for Coarse Stuff and Building Mortar only : Non-hydraulic and semi-hydraulic.

For each type of lime the requirements specified include the description, chemical composition, residue on slaking (or, for the hydrated limes, fineness) volume yield, workability, hydraulic strength, soundness, etc., as appropriate to the particular type. Details are given in an appendix for the procedure to be adopted in slaking quicklimes and the methods of carrying out the various tests are also outlined in full.

This new British Standard (No. 890-1940) may be had from the British Standards Institution, 28 Victoria Street, London, S.W.1, price 3s. 6d. each (3s. 8d. post free).

Specification for Bleach Ointment

The British Standards Institution have just issued a BS/ARP 40 for anti-gas ointment. The object of the Standard is to provide a guide as to the quality of a satisfactory ointment for anti-gas treatment. The ointment is the type generally known as bleach ointment which is compounded by mixing stabilised bleaching powder with white mineral jelly. The specification defines not only the properties of the ointment itself, but also those of the bleaching powder and the mineral jelly from which it is made. The manner in which the tests are to be carried out is described in a number of appendices.

Copies of this specification may also be had from the British Standards Institution, price 2d. each. (4d. post free).

Italo-Rumanian Trade Agreement

Chemical Quotas Raised

THE text of the trade agreement signed between Italy and Rumania on March 20 has now been published. Under this agreement, the exchange rate between the leu and the lira has been increased from 7.17 to 9.50 lei per lira for clearing payments and to 10.75 lei per lira for payments in free currency. Rumanian import quotas for Italian goods have thus been increased considerably, while some Italian import quotas for Rumanian goods have also been increased.

Import quotas for Italian goods into Rumania have been fixed as follows: Olive oil, 13,300,000 lei; tannic extracts, 33,300,000 lei; dyestuffs, 1,330,000 lei; ferro-silicon, 26,600,000 lei; tartaric and citric acid, 26,600,000 lei; insecticides, 13,300,000 lei; essential oils, 4,000,000 lei; ultramarine, 700,000 lei; other chemical products, 200,000,000 lei. In addition, the import of 40,000 quintals of sulphur and 60 quintals of metallic mercury will be allowed against free currency.

Quotas for the import of Rumanian goods into Italy are: Ethyl alcohol, 8,000,000 lire; tallow, 800,000 lire; solid bitumen, 2,000,000 lire; solid paraffin, etc., 5,000,000 lire; organic fertilisers, 1,000,000 lire; carbon black, 2,000,000 lire; and cellulose, of which 50 per cent. will be sulphate cellulose, 5,000,000 lire.

Personal Notes

MR. WILLIAM THOMPSON, M.I.Chem.E., M.I.Weld.E., has been appointed chief engineer of Magnesium Metal Corporation, Ltd., Swansea.

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MR. JOHN HENRY HANSARD, MR. FRANK SAMUEL and MR. ROWLAND HUNTLY MUIR have been appointed directors of Lever Brothers and Unilever, Ltd.

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MR. C. ZULVER, for many years marine superintendent of the Anglo-Saxon Petroleum Co., has retired after 30 years' service with the "Shell" group. Mr. John Lamb has been appointed in his place.

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DR. F. BRIERS, head of the Chemistry and Biology Department of Derby Technical College, has been appointed head of Burnley (Lancs.) Technical College in succession to Mr. W. Mann-Rankin. Dr. Briers was formerly with I.C.I., Ltd.

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PROFESSOR GILBERT NEWTON LEWIS, Professor of Chemistry at the University of California, Berkeley, distinguished as a founder of the electronic theory of valency and of a number of important branches of general chemistry, has been elected a foreign member of the Royal Society.

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MR. B. W. METHLEY has been appointed chairman of the South Yorkshire section of the Institute of Chemistry in succession to DR. EDWIN GREGORY. MR. A. H. DODD, chief chemist of the Thorncriffe Co., has been elected vice-chairman and MR. G. PARKIN succeeds MR. W. W. STEVENSON as hon. secretary. Mr. Stevenson is hon. treasurer in place of DR. A. R. Bowen.

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MR. GEORGE E. PEARSON has retired from the positions of managing director of The Wellcome Foundation, Ltd., and general manager of Burroughs Wellcome and Co. He will continue to act as governing director and chairman of The Wellcome Foundation, Ltd. Mr. T. R. G. BENNETT has been appointed managing director of The Wellcome Foundation, Ltd., and general manager of Burroughs Wellcome and Co.

OBITUARY

MR. HAROLD ALBAN WILKINS, president of Lever Brothers, Ltd., and associated companies in Canada since 1937, died in California last month, aged 37.

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MR. HUGH C. THOMAS, secretary of the Tinplate International Cartel, was found dead in his office at Swansea on Wednesday. He was 49. Death is believed to be due to natural causes.

New Control Orders

Export Licensing

THE Board of Trade has made the Export of Goods (Control) (No. 14) Order, 1940, which comes into force on June 6, and under which the following changes are made, among others : (a) Licences will in future be required for the export to any destination of acetic acid, ammonium perchlorate, and potassium perchlorate; (b) licences will in future be required for the export to certain destinations of gall nuts.

Iron and Steel Control

The Minister of Supply has issued Direction No. 2 dated May 25, under the Control of Iron and Steel (No. 8) Order, 1940. The Direction substitutes new schedules of sheet prices for those hitherto ruling, the effect of which is to provide a special price for thick sheets or light plates 3 mm. thick and over when these are rolled on a sheet mill. In future, the maximum price and extras for sheets of this nature will be the same as for sheets immediately below 3 mm.

Chemical Engineering Group

21st Annual Meeting

THE twenty-first annual meeting of the Chemical Engineering Group, Society of Chemical Industry, was held at the Waldorf Hotel on May 23, with the Chairman, Mr. H. W. Cremer, presiding.

In opening the meeting the chairman stated that, although the country was engaged in war, it had been hoped to celebrate the coming-of-age of the group in a quiet way, by holding the annual dinner on normal lines. In view, however, of the worsening of the continental situation during the previous few days the hon. officers of the group had felt it would have been entirely inappropriate to hold such a function at the present time and arrangements had therefore been cancelled at very short notice. This had not been done from any feeling of panic but in the full belief that all members would approve the action that had been taken.

The Hon. Secretary, Mr. J. M. Leonard, presented his report for 1939, which was unanimously approved, and the Hon. Treasurer, Mr. F. A. Greene, presented the accounts for the year 1939, which were unanimously adopted.

The following were elected hon. officers for 1940/41: Chairman, Mr. H. W. Cremer; Hon. Secretary, Mr. J. M. Leonard; Hon. Treasurer, Mr. F. A. Greene; while Dr. G. D. Bengough, Mr. F. W. Clark, Dr. G. E. Foxwell and Mr. W. S. Lloyd Willey were elected members of general committee.

On the motion of Mr. W. Russell, a cordial vote of thanks was passed to the chairman for his work for the group in the past year. In his reply, Mr. Cremer acknowledged the support he had received from the general committee and in particular from Mr. Leonard, Mr. Greene and Mr. M. B. Donald, and from the Assistant Secretary, Mr. C. J. T. Mackie, and the staff.

Commodity Insurance Scheme

War Risks Insurance

A N Order-in-Council amending the War Risks Insurance Act, 1939, was made on May 22, by virtue of the powers conferred by the Emergency Powers (Defence) Acts 1939 and 1940. The Order came into operation on May 23 and its principal effect is to make insurable under Part II of the War Risks Insurance Act goods which are supplied under contracts for work, labour and materials. On and after June 3 the insurance of such goods will be compulsory, but prior to that date it will be voluntary. Compulsion will apply only when the value of all insurable goods owned in the United Kingdom by a person carrying on business either as a seller or supplier (or as both seller and supplier) exceeds £1000. A person carrying on business as a supplier of goods, within the meaning of the Order-in-Council, is a person carrying on business in the course of which he supplies goods for contracts made by him for work, labour and materials. Such goods cease to be insurable by the supplier when (a) the ownership of them passes from the supplier under the terms of the contract; or (b) when the goods are affixed to or otherwise made part of goods belonging to the person to whom they are supplied or (c) at the time when the goods are delivered at premises in the occupation of the person to whom they are supplied; whichever time is the earliest. Goods of any description excluded from insurance under Part II of the Act by virtue of an Order made under Section II(4) remain uninsurable. The new Order-in-Council further provides that where a person carrying on business as a seller or supplier of goods of any description owns material from which the goods which he sells or supplies are produced, the materials will be insurable, even when the goods are produced not by the seller but by some other person for him. Applications for insurance should be made to the Fire Insurance Companies or to Lloyd's, who are acting as the agents of the Board of Trade for this purpose.

General News

THOMAS TAIT AND SONS, LTD., Inverurie Mills, Inverurie, Aberdeenshire, are developing, to a large degree, the use of oat straw pulp for the manufacture of paper. During the last war this firm was the largest consumer of straw in the paper industry.

ALL DIRECT IMPORTERS OF ROSINS (colophony) other than those solely imported from France and her Colonies are asked to communicate immediately with the Secretary, the United Kingdom Rosin Import Committee, 52 Leadenhall Street, London, E.C.3.

GLASGOW CORPORATION IS TO EXPERIMENT with the running of buses on gas instead of petrol. The Transport Department is to equip a single-deck bus with a compression ignition engine run on gas drawn from a bag container fixed on the roof, and another bus is to be converted to the use of compressed gas to be obtained from new compressing plant to be installed at Larkfield Garage. The second process involves an expenditure of almost £1000. The conversion of the vehicle from oil to gas propulsion will cost £178, and the laying of service pipes and installation of the compressing station at the garage will cost about £750. The adaptation of the single-deck bus with gas-bag supply will cost, it is estimated, £87.

IMPERIAL CHEMICAL INDUSTRIES, LTD., were praised by Judge Gamou, at Stockton County Court this week, for the example they were setting to other employers in regard to the redemption of workmen's compensation. On behalf of I.C.I., Mr. C. R. Watson, of Stockton, made application to redeem compensation paid to John Redvers Ainsley, of Norton, injured in November, 1936, at the rate of 27s. 2d. weekly. The redemption figure was £1044, but Mr. Watson mentioned the Bill, under which payment to the wife and two children would be increased. The company wished to extend benefits of the proposed law to the wife and children, and the redemption figure they would pay was £1337.

THE MINISTRY OF SUPPLY has agreed to consider proposals made by Mr. A. Woodburn, M.P., Mr. J. Westwood, M.P., and Mr. T. Cassells, M.P., all of whom sit for constituencies in Central Scotland, to utilise the Scottish light castings industry for the manufacture of machine tool castings. Major B. Austin, of the Ministry of Supply, has inspected the Scottish foundries, which employ 10,000 men in light castings trades. The industry has been affected by the hold-up of housing activities, and the M.P.'s claim that it can be adapted for war production. It is also suggested that freight rates should be equalised as between Falkirk, centre of the Scottish light castings industry, and English centres.

SLIGHT MODIFICATIONS in the sale conditions of bismuth salts are announced by Messrs. May & Baker, Ltd. The only prices affected are those of bismuth subgallate, advanced 5d. per lb. (to 9s. 2d. for 28 lb.-1 cwt.; 8s. 11d. for 1 cwt. and over) and bismuth subnitrate, up 3d. per lb. (to 7s. 6d. for 28 lb.-1 cwt.; 7s. 3d. for 1 cwt. and over). A rebate of 3d. per lb. will be allowed off the 1-cwt. prices on sales of not less than 2 cwt., or against contracts of not less than 2 cwt. provided the whole quantity is ordered within three months and payments are made within 14 days of date of each delivery. For quantities of 28 lb. and upwards in the home trade, an extra charge of 3d. lb. shall apply for 1 lb. cartons and 1 lb. parcels and it is a condition of resale that this extra charge applies even when repacking into 1 lb. cartons or 1 lb. parcels is effected by the purchaser, but smaller quantities than 28 lb. are not subject to this extra charge. Packing cases are charged at 10s. (1 cwt.) and 15s. each (2 cwt.).

Foreign News

THE MONSANTO CHEMICAL CO. of St. Louis, U.S.A., has undertaken negotiations to begin the manufacture in Australia of aspirin acetanilide, salicylic acid and similar products.

THE ANNUAL REPORT of the Metallgesellschaft A.G. for 1938/39 states that the extension of plant started in 1937/38 has now been completed. Efforts to convert production to German raw materials had been further intensified during the year, both as regards production and manufacture and in the development of new processes. Processes for the galvanisation of iron and steel and the introduction of fine zinc alloys as substitute materials had been extended. The personnel of the parent company had been increased by 21 per cent.

From Week to Week

CANADIAN INDUSTRIES, LTD., announce that they have undertaken the manufacture of zinc chloride at Hamilton, Ontario, using existing buildings. This will be the first commercial production of this item in the Dominion.

A NEW COMPANY, the Intreprinderea Cer-Chimico-Farmaceutice S.A.R. (I.C.F.) has been registered at Bucarest with a nominal capital of 1,000,000 lei, to undertake mining activities, and trade and commerce in and export of mining products, wax products, and chemical and pharmaceutical products, as well as the representation of all similar products on a commission basis. The directors, elected for four years, are I.C. Dumitrescu, C. Dragutesco and I. Fraisie (managing director).

THE ADMINISTRATIVE COMMITTEE of the Yugoslav National Bank has decided to issue special credits to industrialists for the purchase of raw materials. The credits will be made to the acceptance of industrial undertakings, which must be provided with the endorsement of a bank. The credits may be given for the purchase of various products, including textiles, tinplate, rubber, paraffin, tallow, crude oil, and coal. The credits will be allowed for a maximum of three months, extensible, under special circumstances, by a further three months.

THE FEDERATION DES SYNDICATS de Produits Chimiques et Engrais et Produits Connexes, whose headquarters are at 11 Rue Portalis, Paris, 8e, now comprises 47 syndicates or groups, most of which are particularly interested in the manufacture and distribution of chemical products for agricultural and other uses, soap, oil and grease for industrial purposes, carburants, fungicides, etc. Although the Fédération has suspended its regular bulletin since last September, because of the war, it still serves its members with pertinent information and is carrying on its co-ordinating functions.

DISCUSSIONS ARE GOING ON with the I.C.I. in India with a view to erecting a bleaching powder plant, but no decision has yet been arrived at, said Sir Muhammad Zafrulla Khan, Law Member of the Government of India, in the Central Assembly recently. He said that the Mysore Government thought of erecting a plant primarily to produce caustic soda. They offered also to produce bleaching powder, and asked the Government of India to take a certain quantity every year, but the Government could not agree to this as their peace-time requirements were negligible. The Mettur Chemical and Industrial Corporation, Ltd., had a proposal for manufacturing bleaching powder, but could not raise sufficient capital to complete the erection of their plant.

A REVIEW OF THE PRODUCTION of glycerine in Germany other than as a by-product of the soap industry was given in an article recently published on glycerine and substitutes. In times of increased demand for glycerine, it is stated, processes are being utilised again which were adopted in Germany, Austria-Hungary and the United States in 1914-18. A more recent process is the synthesis from propane via propane trichloride. It is expected that glycerine derived through these processes will shortly cover all Germany's requirements of the product. Meanwhile substitutes are being used, which are either substances with about the same chemical and physical properties as glycerol or substances which possess certain of the physical properties of glycerine.

CONFIRMATION THAT EXTRA SALES of Chilean nitrate are being booked as a result of the European war is seen in the official admission of the Sales Corporation, the monopoly organisation, that sales for the year ending July, 1940, are expected to reach higher levels than in previous years, provided that maritime transport does not become too scarce or expensive. While no official mention is made of market ranking, it is understood that the United States is the largest purchaser of Chilean nitrate, while Egypt, where purchases have been growing rapidly, is second. Increased orders have also come since the outbreak of war from France, Japan and Italy. Chile expects to benefit from the markets in which German synthetic products are now unable to compete.

Forthcoming Events

THE GENERAL MEETING OF THE ROYAL INSTITUTION will take place at 21 Albemarle Street, London, W.1, on June 3 at 5 p.m.

COMPANY MEETING**Beechams Pills, Ltd.****Further Progress****Mr. P. E. Hill on Record Profits**

The twelfth ordinary general meeting of Beechams Pills, Ltd., was held on Wednesday at the May Fair Hotel, London, W.

Mr. Philip E. Hill (the chairman) said: It is more than difficult at a time when our very existence is threatened by a relentless enemy to attune our minds to the normal consideration of business, which is a matter of insignificance, except insofar as it helps to contribute to the sinews of war.

We have every reason to be gratified with the progress made by our business since I met you a little less than a year ago. The forecasts then made have been fully justified. The profits of £1,055,615 again constitute a record for the eighth consecutive year, clearly indicating the progressive strength of the business. Our export trade provides an encouraging and satisfactory feature, on which I shall have something to say later. During the year we have acquired the business of the County Perfumery Company, which, together with our other recent acquisitions, has shown results above our expectations. We have contributed no less than £661,307 17s. 10d. to the country's exchequer by way of taxation.

£1,055,000 Profit Figure

Our total profit figure of £1,055,000 has been arrived at after providing £84,496 for the redemption of Preference shares in subsidiary companies and without increasing our selling prices to the public. We recommend the transfer of £79,124 to the development fund, £70,000 to the reserve for merger and reorganisation, and an increase in the carry-forward of some £20,000.

We are recommending a final payment of 14.81 per cent., less tax, on the Deferred capital, making a total of 28½ per cent., less tax, for the year, which is within the limit imposed by the Chancellor.

Notwithstanding the prevailing conditions, our sales at home and abroad continue to show considerable improvement. We have been devoting an increasing amount of attention to our export trade, and as a result of a world survey just completed, we are satisfied that our export trade has even greater scope than we should have thought possible.

Export Trade Success

In view of the fact that export markets are of paramount importance to the nation at the moment, we are intensifying our efforts in this direction, and the success we have recently met with encourages us to hope for still greater success in the future.

Shareholders will, I am sure, be pleased to know that we have formed a National Savings Association for the staff of our various companies, which is operating successfully.

No forecast of the future is expected, and neither will it be attempted. No man can say what lies in front of us—but that we shall face it with that dogged perseverance which has been characteristic of our country in the past is beyond question.

The chairman concluded by moving the adoption of the report and accounts, which was seconded by Mr. J. Stanley Holmes, M.P., the managing director, and carried unanimously. The dividend recommendations were approved.

The retiring directors, Mr. Philip E. Hill, Mr. H. A. Meredith and Mr. G. Morrison, were re-elected, and the auditors, Messrs. Price, Waterhouse and Co., having been re-appointed, a hearty vote of thanks to the chairman, directors, and staff closed the meeting.

British Chemical Prices**Market Reports**

FIRM price conditions are in evidence throughout the general chemical market and a moderate increase in the volume of inquiry is reported. Contract deliveries on the whole are proceeding along normal lines although in some directions fresh spot orders are being placed with difficulty. Quotations for lead oxides and white lead have been advanced by 10s. per ton as from May 27, and elsewhere prices display an upward tendency. A quiet trade is passing in the market for coal tar products, a moderate inquiry being reported both for home and export. A fairly steady demand is being put through for solvent and heavy naphtha, xylol, and creosote oil.

GLASGOW.—Business in the Scottish heavy chemical market has been very active during the past week, spot dealings and inquiries continuing to be received. Prices, of course, are still on the upgrade. Local shortages of carbon tetrachloride, Epsom salts, oxalic acid and trisodium phosphate are being experienced, and there is no sign of any improvement in deliveries. Red lead and litharge have been increased 10s. per ton from May 27.

MANCHESTER.—The cotton and woollen textile industries in the northern areas are working at a high level of capacity and there is a consequent steady demand on the Manchester market for heavy chemical products for the dyeing and allied industries. Fair contract deliveries are also being taken up in most of the other leading consuming trades. With regard to new bookings, these during the past week had been on moderate lines. The changed conditions in the Low Countries has resulted in a further tightening of the supply position of certain imported materials. Prices generally are on a firm basis. Benzol, toluol and the naphthas are active sections of the by-products market.

Price Changes

Alum.—Loose lump, £9 10s. per ton, d/d, nominal.

Antimony Sulphide.—Golden, 9½d. to 1s. 7½d. per lb., according to quality. Crimson, 1s. 7½d. to 1s. 11½d. per lb.

Arsenic Sulphide.—Yellow, 1s. 8d. to 1s. 9d. per lb.

Carbon Tetrachloride.—£18 to £53 per ton, according to quantity, drums extra.

Creosote.—Home trade, 4½d. to 5d. per gal., f.o.r., makers' works; exports 6d. to 6½d. per gal., according to grade.

MANCHESTER: 4½d. to 7s.

Lead, Red.—English, 5/10 cwt., £12; 10 cwt. to 1 ton, £11 15s.; 1/2 tons, £11 10s.; 2/5 tons, £11; 5/20 tons, £10 10s.; 20/100 tons, £40; over 100 tons, £39 10s. per ton, less 2½ per cent. carriage paid; non-setting red lead 10s. per ton dearer in each case. Continental material £1 per ton cheaper.

Lead, White.—Dry English, less than 5 tons, £51 10s.; 5/15 tons, £47 10s.; 15/25 tons, £47; 25/50 tons, £46 10s.; 50/200 tons, £46 per ton less 5 per cent. carriage paid; Continental material £1 per ton cheaper; ground in oil, English, 1/5 cwt., £60; 5/10 cwt., £59; 10 cwt. to 1 ton, £58 10s.; 1/2 tons, £57; 2/5 tons, £56; 5/10 tons, £54; 10/15 tons, £53; 15/25 tons, £52 10s.; 25/50 tons, £52; 50/100 tons, £51 10s. per ton less 5 per cent. carriage paid. Continental material £2 per ton cheaper.

Pitch.—Medium, soft, 50s. per ton, f.o.b. **MANCHESTER:** 52s. 6d. to 55s. f.o.b., East Coast.

Pyridine.—**MANCHESTER:** 18s. 6d. to 22s. per gal.

Sodium Sulphide.—**MANCHESTER:** Concentrated solid, 60/62 per cent., £13 10s.; crystals, £9 15s.

Oil Prices

Linseed Oil. for the period ending July 1, £46 per ton.

Turpentine.—**HULL:** American turpentine, spot, 55s. 6d. per cwt. in barrels ex store.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

CYPRUS SULPHUR AND COPPER CO., LTD., London, S.W. (M., 1/6/40.) May 15, £3262 and £8938 debentures dated December 20, 1921, and May 9, 1929, respectively, parts of a series registered December 21, 1921; also May 15, £1460 and £9540 debentures, dated April 29, 1937 and May 8, 1940, respectively, parts of a series registered November 13, 1931. *£30,460. August 7, 1939.

FRANCOIS CEMENTATION CO., LTD., London, E.C. (M., 1/6/40.)—May 15, £409 14s. Od. charge (sec. 81, 1929 Act), to Cheltenham and Gloucester Building Society; charged on 88 Drysdale Avenue, Chingford. *£130,000. August 4, 1939.

PLYMOUTH VARNISH AND COLOR CO., LTD. (M., 1/6/40.)—May 15, £600 mortgage of property acquired January 31, 1934 (sec. 81, 1929 Act), to Mrs. M. J. White, Plymouth; charged on 60 Notte Street, Plymouth. *£600. February 16, 1940.

County Court Judgments

BONELL AND CO., LTD., Agard Street, Derby. (C.C.J., 1/6/40.)—Wholesale chemists. £10 13s. 4d. March 29.
JUKES, — (male), 268 Avery Hill Road, Eltham. (C.C.J., 1/6/40.)—Paint manufacturer. £10 14s. 6d. April 11.

Companies Winding-Up Voluntarily

TITANINE-EMAILLITE, LTD. (C.W.U.V., 1/6/40.)—General meeting of members at 39 St. James's Street, London, S.W.1, on Friday, June 28, 1940, at 2 p.m.

Company News

B. Laporte, Ltd., report a net profit for the year to March 31, 1940, of £105,541 (£92,286). To tax reserve, £34,000 (£19,000); pension fund, £5,000 (£5,000); general reserve, £15,000 (£15,863). Final 10 per cent., making 15 per cent., less tax (22½ per cent.). Forward, £27,738 (£30,616).

Chemical and Allied Stocks and Shares

DESPITE the dominating influence of the war news and knowledge of the wide powers of industrial control now possessed by the Government, there have again been no signs of heavy liquidation in the stock and share markets. Although Excess Profits Tax at 100 per cent. will apply only to Government-controlled establishments, it is realised that many additional concerns may come under the control of the authorities. All points considered, it is not easy to assess the dividend prospects of individual companies, but although it is realised that markets will continue to move very closely with the war news, the general assumption is that, taking more than a very short view, security values are probably at unduly low levels.

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On balance Imperial Chemical ordinary have declined moderately from 28s. 9d. to 28s. 4½d. Granted earnings permit, the company will be allowed to maintain its dividend at around the 8 per cent. which ruled for the past year. In fact, the dividend maximum is 8½ per cent., based on the highest amount distributed in the pre-war standard period. B. Laporte at 57s. 6d. were 2s. 6d. lower, as compared with a week ago, but the price did not appear to be tested by business. Borax Consolidated deferred were better at 25s., but Goodlass Wall were lowered to 8s. and Pinchin Johnson went back from 19s. 9d. to 18s., while International Paint were 1s. 3d. down at 78s. 9d. Cerebos were lowered from 4s. to 4s. 4d., but are now "ex" the final dividend; the company's results for the past year created a good impression and exceeded market expectations. Reckitt and Sons ordinary shares were little changed at 92s. 6d.

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British Glues and Chemicals 4s. shares were slightly lower at 6s. 3d.; the financial results fail to be issued in a few weeks. Results of Morgan Crucible are also due shortly; the 5½ per cent. first preference are quoted at 23s. 9d. and the 5 per cent. second preference at 22s. 6d. Blythe Colour 4s. shares were lower at 7s. 6d., compared with 8s. 3d. a week ago, and William Blythe 3s.

Griffiths Hughes Proprietaries, Ltd., manufacturing chemists, are maintaining their distribution on the ordinary shares at 5 per cent. The profit of the operating company has increased from £112,550 to £155,418.

Astrin Bros., Ltd. (360,460).—Importing and exporting chemists, 16-17 Devonshire Square, E.C.2, have increased their nominal capital by the addition of £1900, in £1 ordinary shares, beyond the registered capital of £100.

The British Thermostat Co., Ltd., report a net profit for the year to January 31 last of £25,616 (£31,586), after charging £36,851 for tax and £1511 for loss of subsidiary company. A final dividend of 11 per cent., less tax, has been declared, making 18½ per cent. for the year (same). The carry-forward is £14,549 (£16,683).

Benzol and By-Products, Ltd., report a trading profit for the year to September 30, 1939, of £59,830 (£83,743). After depreciation, £8000, and all expenses, the net profit is £20,059 (£47,144). The carry-forward is £5328 (£516). A further 3 per cent. payment on arrears of dividend on the 6 per cent. participating preference shares, bringing the arrears down to September 30, 1938, has been announced.

J. C. and J. Field, Ltd., soap manufacturers, etc., report that for the year ended March 31 last the profit rose from £49,985 to £54,116. Although expenses were higher than a year ago the net profit shows an increase from £38,811 to £40,854. The ordinary dividend is maintained at 15 per cent., less tax, with the payment of a final dividend of 10 per cent. The reserve receives a further £6000, and goodwill is reduced by another £5000, a balance of £13,771 being carried forward, compared with £11,417 brought in.

Chemical Trade Inquiries

France.—An agent established at Bordeaux wishes to obtain the representation for South-Western France, on a commission basis, of United Kingdom manufacturers of tartaric and citric acids, tannins for wines, paraffin, kieselguhr, metabisulphite of sodium and potassium, oenologic phosphate of ammonia, etc. (Ref. No. 333.)

Iraq.—An agent established at Bagdad wishes to obtain the representation of United Kingdom manufacturers of dyes and chemicals (including indigo) for Iraq. (Ref. No. 338.)

New Companies Registered

Pressure Amalgamation, Ltd. (361,250).—Private company. Capital £100 in 100 shares of £1 each. Mining, mechanical and general engineers, manufacturers of mining machinery, plant and implements, chemists, metallurgists, toolmakers, founders, etc. Subscribers: Cecil F. Cooper, 116 Old Broad Street, E.C.2, and Frederick Johnson. Solicitors: Norton Rose Greenwell and Co., 116 Old Broad Street, E.C.2.

shares were quoted at 6s. 3d. Lever and Unilever remained around the lower level reached recently, and the preference units were little changed, allowing for the deduction of the half-yearly dividends from prices. British Oil and Cake Mills preferred reacted from 41s. to 38s. 9d., while United Premier Oil and Cake 5s. shares were 6s. 6d., a decline of 1s. on balance. Iron and steel securities were lowered sharply in some cases, sentiment being affected by the belief that in many additional instances companies in the heavy industries will become Government-controlled, and will, therefore, be liable to Excess Profits Tax at 100 per cent. In other directions Turner and Newall at 62s. 6d., and Murex at 72s. 6d., were fairly steady features. British Match changed hands around 31s. 3d., while Bryant and May preference shares were marked down 1s. 3d. to 58s. 9d. Swedish Match were no better than 5s. and were a nominal market. Distillers ordinary units were inclined to improve on hopeful market estimates in regard to the final dividend, and at the time of writing the price is 60s. 9d., compared with 59s. 9d. a week ago.

* * *

Boots Drug were around 37s. and were unresponsive to the good impression created by the full results; the market is awaiting the meeting with interest for any reference to the incidence of the Purchase Tax. Beechams Pills deferred shares were 7s. 3d. and Sangars 2ls. Results of the last-named company are due shortly. Timothy Whites were around 22s. Elsewhere, British Plaster Board transferred around 8s. 6d., but cement shares declined sharply on balance, under the influence of the prevailing trend on the Stock Exchange. Oil shares were reactionary. Owing to the very small amount of business passing this week, quotations for many securities were not adequately tested.

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It was announced after these notes were written that it had been decided that the increase in Excess Profits Tax to 100 per cent. is to apply to all trades and businesses and not only to Government-controlled undertakings.

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Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

APPLICATIONS OF AMINO-FORMALDEHYDE ADHESIVES.—Aero Research, Ltd., N. A. de Bruyne. 5474.
 PROCESS FOR OBTAINING OILS of low pour-point.—A/B Separator-Nobel. (Jan. 4, '39.) (Germany, Jan. 4, '38.) 5419.
 CELLULOSE DERIVATIVES.—British Celanese, Ltd. (United States, March 25, '39.) 5302.
 ESTERIFICATION OF CELLULOSIC MATERIALS.—Calico Printers Association, Ltd., J. R. Whinfield. 5520.
 PRODUCTION OF OXYGEN-CONTAINING COMPOUNDS.—H. Dreyfus. 5300.
 MANUFACTURE OF OXYGENATED ORGANIC COMPOUNDS.—H. Dreyfus. 5301.
 MACHINES FOR MOULDING PLASTIC MATERIALS by injection.—W. Ernst, and I. B. Lawyer. (Sept. 26, '38.) 5427.
 PROCESS FOR THE TREATMENT OF POLYMERISATES OF BUTADIENE and chlorobutadienes.—Hungarian Rubber Goods Factory, Ltd. (Hungary, March 30, '39.) 5507.
 FAST DYEINGS.—I. G. Farbenindustrie. (Germany, March 15, '39.) 5334.
 METHOD OF MANUFACTURING METALLIC MAGNESIUM.—J. Ishibashi, T. Arimori, K. Shima and R. Yoshimura. 5291.
 NAPHTHALENE DERIVATIVES and method of obtaining same.—L. Mellersh-Jackson (Parke, Davis and Co.). 5549.
 MANUFACTURE OF ARYLAMINES including their use as photographic developing agents.—Kodak, Ltd. (Eastman Kodak Co.). 5407.
 TREATMENT OF MAGNESIUM and magnesium alloys.—Magnet Products, Ltd., F. A. Allen, J. Morgan and Magnesium Elektron, Ltd. 5277.
 PANTOTHENIC ACID.—Merck and Co., Inc. (United States, April 3, '39.) 5484.
 LACTONES OF 2-ALKYL-3-ALKOXY-4-HYDROXYMETHYL-5-CARBOXY-PYRIDINE.—Merck and Co., Inc. (United States, April 13, '39.) 5484, 5487.
 SYNTHESIS OF VITAMIN B.—Merck and Co., Inc. (United States, April 13, '39.) 5486, 5488.

Complete Specifications Open to Public Inspection

BITUMINOUS CONCRETE.—J. Oberbach. Sept. 14, 1938. 37824/38.
 METHOD OF PRODUCING LIQUID NITROGEN TETOXIDE.—E. I. du Pont de Nemours and Co. April 30, 1938. 12549/39.
 PRODUCTION OF THIN-BOILING THICK-SETTING STARCH.—Corn Products Refining Co. Sept. 16, 1938. 18123/39.
 MANUFACTURE OF THE PRODUCTION OF ACROLEIN.—Deutsche Gold und Silber-Scheideanstalt vorm. Roessler. Aug. 9, 1938. 20999/39.
 MANUFACTURE AND PRODUCTION OF VINYL ESTERS.—I. G. Farbenindustrie. Aug. 13, 1938. 22552/39.
 COLOURING-COMPOSITIONS FOR TEXTILES.—Calco Chemical Co., Inc. Sept. 8, 1938. 22869/39.
 HYDRATION OF OLEFINES.—Usines de Melle. Sept. 7, 1938. 22983/39.
 PAINTS AND LIKE COATING MATERIALS.—Dr. A. Wacker Ges. für Elektrochemische Industrie. Aug. 13, 1938. 23316/39.
 MANUFACTURE AND PRODUCTION OF UREA which is well capable of being stored and strewed.—I. G. Farbenindustrie. Aug. 27, 1938. 23544/39.
 MANUFACTURE OF ACTIVATED CARBON.—Y. Ushio. Sept. 7, 1938. 23676/39.
 DIMETHYL ESTER OF METHYL 3-methoxy pyridine 4,5-dicarboxylic acid, and process for preparing same.—Merck and Co., Inc. Sept. 3, 1938. 24012/39.
 MANUFACTURE AND USE OF HIGH MOLECULAR NITROGEN COMPOUNDS. Rohm and Haas Ges. Aug. 23, 1938. 24290/39.
 PURIFICATION OF USED LUBRICATING OILS.—J. A. Lautrette. Sept. 9, 1938. 24417/39.
 PROCESSES FOR VITREOUS ENAMELLING.—A. Matthes. Sept. 9, 1938. 25004/39.
 PROCESS FOR THE CATALYTIC CYCLISATION OF ALIPHATIC HYDROCARBONS.—N.V. de Bataafsche Petroleum Maatschappij. Sept. 15, 1938. 25223/39.
 PRODUCTION OF TITANIUM PIGMENTS.—E. I. du Pont de Nemours and Co. Sept. 8, 1938. 25314/39.

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